CURRICULUM VITAE

Thomas Oliver Carpenter

Address: [redacted]
Date of Birth:
Place of Birth:

Education:

1973 B.A. University of Virginia - with distinction
1977 M.D. University of Alabama Medical School

Postdoctoral Training:

Internship and Residencies:

1977-1978 Intern in Pediatrics, Children's Hospital, University of Alabama, Birmingham
1978-1980 Resident in Pediatrics, Children's Hospital, University of Alabama, Birmingham

Fellowship:

1980-1983 Fellow in Medicine (Endocrinology), Children's Hospital, Boston, MA, and Research Fellow in Pediatrics, Harvard Medical School, Boston

Licensure and Certification:

1978 Alabama Medical License
1980 Massachusetts Medical License
1982 American Board of Pediatrics
1983 American Board of Pediatrics - Subspecialty in Endocrinology
1986 Connecticut Medical License
1999 American Board of Pediatrics/Endocrinology: Recertification (voluntary)

Membership in Professional Organizations:

American Federation for Medical Research
American Pediatric Society
American Society for Bone and Mineral Research
Endocrine Society
Lawson Wilkins Pediatric Endocrine Society
Society for Pediatric Research

Editorial Boards:

1988-1995	Magnesium Research
1997-	Current Opinion in Pediatrics
2001-	Journal of Clinical Endocrinology and Metabolism

Academic Appointments:

1983-1986	Instructor in Pediatrics, Harvard Medical School, Boston, MA
1986-1991	Assist. Professor, Pediatrics, Yale U. School of Medicine, New Haven, CT
1991-2000	Associate Professor of Pediatrics, Yale University School of Medicine
2000-	Professor of Pediatrics, Yale University School of Medicine

Hospital Appointments:

1983-1986	Assistant in Medicine (Endocrinology), Children's Hospital, Boston, MA
1986-	Attending Physician (Pediatrics), Yale-New Haven Hospital, New Haven, CT

Awards and Honors:

1982	Endocrine Research Award Fellowship, Harvard Medical School
1992	Visiting Professor, Dalhousie University Medical School, Halifax, Nova Scotia
1993	Constantine Anast Lecturer, Brigham and Woman's Hospital and Harvard Medical School, Boston
1994	Hulda Wohltmann Lecturer, Medical University of South Carolina, Charleston
1994-2000	Named in Best Doctors in America
1996	Appointed to Pediatric Endocrinology Sub-board, American Board of Pediatrics
1996	Kroc Foundation Visiting Professor, University of Oklahoma Health Sciences Center, Oklahoma City
1999-	Medical Advisory Board, Charles H. Hood Foundation, Boston
2001- 2002	Chair, Endocrinology Sub-board, American Board of Pediatrics

Teaching Experience:

1980	Lecturer in pathophysiology, Massachusetts College of Pharmacy (Undergraduate and graduate curricula)
1982-1984	Lecturer in Medical Biochemistry, Harvard-MIT Program in Health Sciences and Technology

1983-1985	Lecturer in Connective and Mineralized Tissue, Department of Oral Biology, Harvard Dental School
1980-1986	Clinical Teaching, Children's Hospital, Boston, MA
1987-1989	Thesis advisor for medical student, Yale Medical School: [redacted]
1990-1993	Thesis advisor for medical student, Yale Medical School: [redacted]
1991, 1993, & 1999	Instructor, Serono Symposia - Lawson Wilkins Pediatric Endocrinology Society Pediatric Endocrinology Review Course

Principal Clinical and Hospital Service Responsibilities:

1983-1986	Attending Physician, Medical Service, Children's Hospital, Boston, MA
1983-1986	Attending Physician, Endocrine Unit and Clinic, Children's Hospital, Boston
1986-	Attending Physician, Pediatric Department (Endocrine Section), Yale-New Haven Hospital, New Haven, CT
1988-	Internship Selection Committee, Department of Pediatrics, Yale Univ. School of Medicine and Yale-New Haven Hospital
1989-	Director, Pediatric Endocrine Fellowship Training Program, Yale University School of Medicine, Yale-New Haven Hospital
1991-1998	Pediatric Grand Rounds Coordinator, Yale Univ. School of Medicine
1999-	Co-Director, Residency and Fellowship Medical Ethics Seminar Series
2001	Acting Chief, Endocrine Section, Yale Univ. Dept. of Pediatrics
2001-	Yale University Conflict of Interest Committee
2001-	Research Subject Advocate, Yale School of Med., Children's Clinical Research Center
2002	Interim Director, Pediatric Ethics Committee,Yale-New Haven Hospital

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Original Articles

1. *Carpenter TO*: Basic pediatrics: a new American physician in an African village hospital. South Med J 72:209-214, 1979.

2. *Carpenter TO*, Carnes DL, Anast CS: Hypoparathyroidism in Wilson's disease. N Engl J Med 309:873-877, 1983.

3. Cole DEC, *Carpenter TO*, Gundberg CM: Serum osteocalcin levels in children with metabolic bone disease. J Pediatr 106:770-776, 1985.

4. *Carpenter TO*, Levy HL, Holtrop ME, Shih VE, Anast CS: Lysinuric protein intolerance presenting as juvenile osteoporosis: clinical and skeletal response to citrulline therapy. N Engl J Med 312:290-294, 1985.

5. Harris Jr HW, *Carpenter TO*, Shanley P, Rosen S, Levey RH, Harmon WE: A progressive tubulointerstitial renal disease in infancy with associated hepatic abnormalities: a report of clinical, biochemical and pathologic findings in two cases. Am J Med 81:169-176, 1986.

6. *Carpenter TO*, Lebowitz RL, Nelson D, Bauer S: Hereditary xanthinuria presenting in infancy with nephrolithiasis. J Pediatr 109:307-309, 1986.

7. Cole DEC, *Carpenter TO*: Bone fragility, craniosynostosis, ocular proptosis, hydrocephalus and distinctive facial features: a newly recognized type of osteogenesis imperfecta. J Pediatr 110:76-80, 1987.

8. *Carpenter TO*, Carnes DL, Anast CS: Effect of magnesium depletion upon metabolism of 25-hydroxyvitamin D in rats. Am J Physiol 253 (Endocrinol Metab 16):E106-E113, 1987.

9. *Carpenter TO*, Pettifor JM, Russell RM, Pitha J, Mobarhan S, Ossip MS, Wainer S, Anast CS. Severe hypervitaminosis A in siblings: evidence of variable tolerance to retinol intake. J Pediatr 111:507-512, 1987.

10. *Carpenter TO*, Pendrak ML, Anast CS: Metabolism of 25-hydroxyvitamin D in the copper-laden rat: a model of Wilson's disease. Am J Physiol 254 (Endocrinol Metab 17): E150-E154, 1988.

11. *Carpenter TO*: Disturbances of vitamin D metabolism and action during clinical and experimental magnesium deficiency. Magnesium Research 1:131-139, 1988.

12. *Carpenter TO*: Mineral regulation of vitamin D metabolism. Bone and Mineral 5:259-269, 1989.

13. Chen C, *Carpenter TO*, Steg N, Baron R, Anast CS: Hypercalciuric hypophosphatemic rickets: mineral balance, bone histomorphometry, and therapeutic implications of hypercalciuria. Pediatrics 84:276-280, 1989.

14. Cooper SG, Richman AH, *Carpenter TO*, Rosenfield AT: Scrotal ultrasonography in Leydig cell hyperplasia. J Ultrasound Med 8:689-692, 1989.

15. New England Congenital Hypothyroidism Collaborative: Elementary school performance of children with congenital hypothyroidism. J Pediatr 116:27-33, 1990.

16. *Carpenter TO*, Insogna KI, Boulware SD, Mitnick MA: Vitamin D metabolism in chronic childhood hypoparathyroidism: evidence for a direct regulatory effect of calcium. J Pediatr 116:252-257, 1990.

17. Walker AT, Stewart AF, Korn EA, Shiratori T, Mitnick MA, *Carpenter TO*: Effect of parathyroid hormone-like peptides on 25-hydroxyvitamin D-1"-hydroxylase activity in rodents. Am J Physiol 258 (Endocrinol Metab 21):E297-E303, 1990.

18. *Carpenter TO*, Imperato-McGinley J, Boulware SD, Weiss R, Shackleton C, Griffen JE, Wilson JD: Variable expression of 5α-reductase deficiency: presentation with male phenotype in a child of Greek origin. J Clin Endocrinol Metab 71:318-322, 1990.

19. *Carpenter TO*: A new compendium for pediatric bone disease (Invited Book Review). Trends in Endocrinol and Metab. 1:373-374, 1990.

20. *Carpenter TO*, Shiratori T: Mitochondrial phosphate transport and 25-hydroxyvitamin D-1α-hydroxylase activity in Hyp mouse kidney. Am J Physiol 259 (Endocrinol Metab 22):E814-E821, 1990.

21. Caprio S, Boulware S, Diamond M, Sherwin RS, Rubin K, *Carpenter TO*, Amiel S, Press CM, Tamborlane WV: Insulin resistance: an early metabolic defect of Turner syndrome. J Clin Endocrinol Metab 72:832-836, 1991.

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23. Irie T, Fukuanga K, Garwood MK, *Carpenter TO*, Pitha J, Pitha J: Hydroxypropylcyclodextrins in parenteral use. II: effects on transport and disposition of lipids in rabbit and humans. J Pharm Sci 81:524-528, 1992.

24. *Carpenter TO*, McPhee DM, Bort R, Mitnick MA, Carnes DL: Dissociation of phosphaturia and 25-hydroxyvitamin D-1α-hydroxylase trophism using a novel

analogue of parathyroid hormone. Am J Physiol 262 (Endocrinol Metab 25): E483-E487, 1992.

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Book Chapters

53. Key LL, Carnes DL, Lian JB, *Carpenter TO*, Anast CS: 1,25 dihydroxyvitamin D and 25 hydroxyvitamin D normalized growth in prednisolone treated rats, but only 25 hydroxyvitamin D improved mineralization. Proc. 5th Intnl Workshop on Vitamin D, Williamsburg, VA, 1982.

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55. *Carpenter TO*, Carnes DL, Anast CS: Effect of magnesium upon 25-hydroxyvitamin D-1α-hydroxylase activity. In: Vitamin D: Chemical, Biochemical and Clinical Update. AW Norman, K Schaefer, HG Grigoleit, D Herrath (Eds.). Berlin:Walter de Gruyter & Co. pp 547-548, 1985.

56. *Carpenter TO*, Mitnick MA, Johnson P, Gundberg CM: Circulating osteocalcin in magnesium deficiency: response to $1,25(OH)_2D_3$. In: Vitamin D: Molecular, Cellular and Clinical Endocrinology. AW Norman, K Schaefer, HG Grigoleit, D Herrath (Eds.). Berlin:Walter de Gruyter & Co. pp 618-619, 1988.

57 Cole DEC, *Carpenter TO*, Goltzman D: Calcium homeostasis and disorders of bone

and mineral metabolism. In: Pediatric Endocrinology, Comprehensive Endocrinology Series. R. Collu, JR Ducharme, JH Guyda (Eds.), 2nd edition, New York:Raven Press. pp 509-580, 1989.

58. Siegel NJ, *Carpenter TO*, Gaudio KM. The pathophysiology of body fluids. In: Principles and Practice of Pediatrics. FA Oski, C DeAngelis, RD Feigin, JB Warshaw, (eds.). Philadelphia:J.B. Lippincott Co. pp. 58-77, 1990.

59. Key LL, *Carpenter TO*: Metabolism of calcium, phosphorus, and other minerals. In: Pediatric Textbook of Fluids and Electrolytes. I Ichikawa (ed.), Baltimore:Williams and Wilkins, pp 98-106, 1990.

60. *Carpenter TO*, Key LL: Disorders of the metabolism of calcium, phosphorus, and other minerals. In: Pediatric Textbook of Fluids and Electrolytes. I Ichikawa (ed.). Baltimore:Williams and Wilkins, pp 237-268, 1990.

61. Anast CS, *Carpenter TO*: Disorders of calcium and phosphate in infancy and childhood. In: Principles and Practices of Endocrinology and Metabolism. Becker K (ed.), Philadelphia:J.B. Lippincott Co. pp 544-550, 1990.

62. Anast CS, *Carpenter TO*, Key LL: Metabolic bone disorders in children. In: Metabolic Bone Disease and Clinically Related Disorders. LV Avioli and SM Krane (eds.), 2nd edition, Philadelphia:W.B. Saunders. pp 850-887, 1990.

63. *Carpenter TO*: Neonatal hypocalcemia. In: Primer on the Metabolic Bone Diseases and Disorders of Mineral Metabolism. Favus MJ (ed.), Richmond:William Byrd Press, pp 139-141, 1990.

64. *Carpenter TO*: Vitamin D metabolism and phosphate homeostasis: physiology and clinical application. In: A Current Review of Pediatric Endocrinology 1991. DM Styne (ed.), Norwell, MA:Serono Symposia USA, pp 137-146, 1991.

65. *Carpenter TO*: Parathyroid disease. In: Gellis and Kagan's Current Pediatric Therapy 14. Burg FD, Ingelfinger J, Wald E (eds.), Philadelphia:WB Saunders, 1993, pp 290-292.

66. *Carpenter TO*: Vitamin D metabolism and phosphate homeostasis: physiology and clinical application. In: A Current Review of Pediatric Endocrinology 1993. J Bell (ed.), Norwell, MA:Serono Symposia USA, pp 213-222, 1993.

67. *Carpenter TO*: Neonatal hypocalcemia. In: Primer on the Metabolic Bone Diseases and Disorders of Mineral Metabolism (2nd ed). Favus MJ (ed.), New York: Raven Press, pp 207-209, 1993.

68. Siegel NJ, *Carpenter TO*, Gaudio KM: The pathophysiology of body fluids. In: Principles and Practice of Pediatrics (2nd ed). FA Oski, C DeAngelis, RD Feigin, JB Warshaw, (eds.), Philadelphia:J.B. Lippincott. pp 60-79, 1994.

69. *Carpenter TO*: Disorders of calcium and bone metabolism in infancy and childhood. In: Principles and Practices of Endocrinology and Metabolism. (2nd ed). Becker K (ed.), Philadelphia: JB Lippincott, pp 631-638, 1995.

70. Pober B, *Carpenter TO*: Idiopathic hypercalcemia. In: Gellis and Kagan's Current Pediatric Therapy 15. Burg FD, Ingelfinger J, Wald E (eds.), Phildelphia: WB Saunders, pp 366-367, 1995.

71. *Carpenter TO*: Rickets. In: Gellis and Kagan's Current Pediatric Therapy 15. Burg FD, Ingelfinger J, Wald E (eds.), Phildelphia: WB Saunders, pp 363-367, 1996.

72. *Carpenter TO*: Neonatal hypocalcemia. In: Primer on the Metabolic Bone Diseases and Disorders of Mineral Metabolism (3rd ed). Favus MJ (ed.), Philadelphia: Lippincott-Raven, pp 228-230, 1996.

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74. *Carpenter TO:* New perspectives on the biology and treatment of X-linked hypophosphatemic rickets. Pediatr Clin North Am 44:443-466, 1997.

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76. *Carpenter TO*: Hypocalcemia and tetany. In: Gellis and Kagan's Current Pediatric Therapy 16. Burg FD, Ingelfinger J, Wald E (eds.), Phildelphia: WB Saunders, pp 777-780, 1999.

77. *Carpenter TO*: Rickets. In: Gellis and Kagan's Current Pediatric Therapy 16. Burg FD, Ingelfinger J, Wald E (eds.), Phildelphia: WB Saunders, pp 780-783, 1999.

78. Pober BR, *Carpenter TO*: Idiopathic Hypercalcemia. In: Gellis and Kagan's Current Pediatric Therapy 16. Burg FD, Ingelfinger J, Wald E (eds.), Phildelphia: WB Saunders, pp 783-784, 1999.

79. *Carpenter TO:* Osteopenic syndromes of childhood. In: International Symposium on: A Current Review of Pediatric Endocrinology . SJ Casella (ed.), Norwell, MA:Serono Symposia USA, pp 187-194, 1999.

80. *Carpenter TO*: Disorders of calcium homeostasis in childhood. In: International

Symposium on: A Current Review of Pediatric Endocrinology . SJ Casella (ed.), Norwell, MA:Serono Symposia USA, pp195-204, 1999.

81. *Carpenter TO*: Neonatal hypocalcemia. In: Primer on the Metabolic Bone Diseases and Disorders of Mineral Metabolism (4th ed). Favus MJ (ed.), Philadelphia: Lippincott-Raven, pp235-238, 1999.

82. *Carpenter TO*: Diagnosis and management of osteopenia in children. In: Clinical Endocrinology Update: 2000 Syllabus. Mandel S (ed.), Bethesda, MD: Endocrine Society Press, pp 329-337, 2000.

83. *Carpenter TO*: Rickets. In: Essence of Office Pediatrics.Stockman JA, Lohr JA (eds.), Phildelphia: WB Saunders, p344, 2001.

84. *Carpenter TO*: Disorders of calcium and bone metabolism in infancy and childhood. In: Principles and Practices of Endocrinology and Metabolism. (3rd ed). Becker K (ed.), Philadelphia: Lippincott Williams & Wilkins, pp 688-695, 2001.

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Abstracts:

A1. *Carpenter TO*, Carnes DL, Anast CS: Demonstration in vitro of 25-hydroxyvitamin-D-1alpha-hydroxylase in mouse renal mitochondria. Calcified Tissue Intl 34(Suppl. 1):548, 1982.

A2. *Carpenter TO*, Carnes DL, Anast CS: Further characterization of 25-hydroxyvitamin-D-1α-hydroxylase in mouse renal mitochondria. Program, 5th Ann Mtg of Amer Soc for Bone and Mineral Research, San Antonio, TX, 1983.

A3. *Carpenter TO*, Carnes DL, Anast CS: Hypoparathyroidism in Wilson's disease. Program, Ann Mtg of the Endocrine Soc. San Antonio, TX, 1983.

A4. *Carpenter TO*, Levy HL, Holtrop ME, Anast CS: Lysinuric protein intolerance: a treatable cause of juvenile osteoporosis. Program, 6th Ann Mtg ASBMR, Hartford, CT, 1984.

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A6. *Carpenter TO*, Carnes DL, Anast CS: Effect of magnesium upon 25-hydroxyvitamin D 1?hydroxylase activity. Program 6th Workshop on Vitamin D, 1985.

A7. Chen CJ, *Carpenter TO*, Anast CS: Familial hypophosphatemic resulting in rickets and nephrolithiasis. Am Soc Bone and Mineral Research, 1985.

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A10. Caprio S, Press M, *Carpenter TO*, Sherwin R, Plewe G, Tamborlane WV: Insulin resistance and hyperinsulinemia: characteristic features of Turner's syndrome. Society for Ped Research, 1988.

A11. *Carpenter TO*, Mitnick MA, Johnson P, Gundberg CM: Circulating osteocalcin in magnesium deficiency: response to $1,25(OH)_2D_3$. Seventh Workshop on Vitamin D, 1988.

A12. *Carpenter TO*, Insogna KL, Boulware S, Mitnick MA: Calcium regulation of

1,25$(OH)_2D$ in hypoparathyroidism. Society for Ped Research, 1989.

A13. Walker AT, Stewart AF, Mitnick MA, Shiratori T, *Carpenter TO*: Stimulation of renal 25-OHD-1α-hydroxylase by synthetic parathyroid hormone-like peptide. American Fed for Clin Research, 1989.

A14. *Carpenter TO*, Shiratori T: Phosphate transport in renal mitochondria from hypophosphatemic mice. American Soc of Bone and Mineral Research/ International Conferences on Calcium Regulating Hormones, 1989.

A15. *Carpenter TO*, McPhee DM, Bort R, Carnes DM: Dissociation of parathyroid hormone-induced phosphaturia and 1alpha-hydroxylase trophism using a novel parathyroid hormone analog. Am Soc for Bone and Mineral Research, 1990.

A16. Najjar S, Thulin G, Shiratori T, Gaudio KM, Siegel NJ, *Carpenter TO*: Effects of ischemia and reperfusion on phosphate transport in rat renal tubular mitochondria. Society for Pediatric Research, New Orleans, 1991.

A17. Gundberg CM, *Carpenter TO*: Effects of phosphorus and 1,25$(OH)_2D_3$ on serum osteocalcin in the Hyp mouse. International Conference on Calcium Regulatory Hormones, Florence, 1992

A18. *Carpenter TO*, Sullivan W, Glorieux R, Travers R, Insogna KL: A prospective trial of phosphate and 1,25$(OH)_2D_3$ in symptomatic adults with X-linked hypophosphatemia. International Conference on Calcium Regulatory Hormones, Florence, 1992.

A19. *Carpenter TO*, Mitnick MA, Smith C, Ellison A, Carey D, Insogna KL. Nocturnal hyperparathyroidism is a frequent feature of hypophosphatemic rickets. J Bone and Min Res 7(Supl 1): S336, 1992.

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National Cooperative Growth Study, Study Coordinators Meeting, Orlando, FL, October, 1994.

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APPEARS THIS WAY
ON ORIGINAL

ACTIVE and RECENTLY COMPLETED RESEARCH SUPPORT

1. 1-K24-01288 (T. Carpenter, PI) 7/1/99-6/31/03
Disorders of Mineral Metabolism in Children (NIH)

This award supports Dr. Carpenter's studies in hypophosphatemic rickets, nutritional rickets, and magnesium metabolism.

2. 1-P30-AR46032 (K. Insogna, PI) 4/1/99-3/31/04
Yale Core Center for Musculoskeletal Disorders (NIH)

Dr. Carpenter serves as administative director of the Physiology Core of the Yale Bone Center.

3. *Effect of Magnesium Nutrition on Bone Health* (T. Carpenter, PI) 1/1/99-12/31/01
Donaghue Foundation

This award supported Dr. Carpenter's epidemiologic analysis, and the ongoing study outlined in the current proposal. These studies provide the rationale for the currently proposed project, which may be considered a continuation of these earlier studies.

4. M01 RR06022 (W. Tamborlane, PI) 12/1/98 - 11/30/03
Children's General Clinical Research Center (NIH)

Role on project: Research Subject Advocate
Dr. Carpenter serves the Children's General CRC as an advocate for children as research

subjects, including insuring the adequacy of consent and safety monitoring of research on children.

5. *Localizing PHEX in Living Cells with Green Flourescent Protein* (T. Carpenter, PI) 4/1/99-3/31/01
Pilot and feasability study, Yale Core Center for Musculoskeletal Disorders (NIH)

This project examined the subcellular localization and movement of PHEX, the protein mutated in X-linked hypophosphatemic rickets, using the reporter moiety, GFP.

6. 1-R03-HD35118 (T. Carpenter, PI) 1/1/98-12/31/99
Isolation of a Phosphate Regulator from Mouse Bone Cells (NIH)

The major goal of this project is to isolate and purify material from bone cells in culture that has specific effects upon renal tubular transport processes.

7. Novo-Nordisk Pharmaceuticals, Inc. 4/1/01-3/31/03
A Concentration Control Trial of Norditropin Cartridges in Children with Growth Hormone Deficiency

This study will assess response to growth hormone administered on the basis of the biological effect of normalization of circulating IGF-1 levels. Dr. Carpenter serves as the PI at this site of the multi-center trial.

8. Merck and Co. 10/1/00-
Alendronate Pharmakokinetic Study in Glucocorticoid-treated Pediatric Patients

This study examines the bioavailability of alendronate given orally, compared to intravenously in children receiving glucocorticoids, in order to determine appropriate pediatric dosing for the the indication of steroid induced osteoporosis. Dr. Carpenter serves as the PI at this site of the multi-center trial